United States Government Department of Energy

# memorandum

DATE January 19, 1989

REPLY TO ATTN OF DP-323.1

SUBJECT Guidelines on Export Controlled Information

TO Distribution

For the past several months the Defense Programs Office of Classification and Technology Policy (OCTP) has been working with a broad cross-section of Department of Energy (DOE) and contractor technical experts and classification officers to prepare guidance on how DOE unclassified information should be disseminated when the same information would be subject to U.S. export control regulations if exported by a private firm or individual. This guidance is needed in an effort to bring DOE and its contractors into compliance with U.S. obligations under the Non-Proliferation Treaty and with the spirit and intent of export control laws and regulations. It responds to many requests from the laboratories and program and field offices for guidance on this subject.

In the course of preparing the attached "Guidelines on Export Controlled Information" (ECI), it became apparent that they should serve more than the original purpose. As now written, they can assist not only in determining whether and how information should be published, but also in determining whether and how information should be disclosed to foreign nationals by other means, such as conferences, foreign national visits and assignments to DOE facilities, transfer of DOE technology for commercialization purposes, and DOE foreign travel.

Among those who assisted OCTP in drafting the attached "Guidelines on Export Controlled Information" (ECI) were technical and classification experts from Los Alamos National Laboratory, Lawrence Livermore National Laboratory, Sandia National Laboratories, Oak Ridge National Laboratory, Pacific Northwest Laboratory, and the Offices of Defense Programs, Nuclear Energy, Energy Research, International Affairs and Energy Emergencies, and the General Counsel. The ECI guidelines also have been reviewed by the senior classification officers of the DOE operations offices, the operations office managers, and the Office of Scientific and Technical Information. The comments of all were considered and extensive revisions were made in preparing the final version, which has been concurred in by the Assistant Secretaries for Nuclear Energy and International Affairs and Energy Emergencies, the Director of Energy Research, and the General Counsel.

It should be stressed that the guidelines are not intended in any way to stifle scientific and technical exchanges with U.S. citizens and firms or with foreign countries under bilateral and multilateral R&D collaboration arrangements. The purpose is to encourage the dissemination of unclassified nuclear, nuclear-related and other sensitive information to U.S. citizens with a need for it while restricting dissemination to adversaries and potential proliferants.

The guidelines may be implemented in greater procedural detail through a DOE order on ECI which is now under consideration but which may require legislation before it can be formally issued. However, during preparation of the guidelines, the general reaction and response from those commenting indicated they were very much needed. Therefore, I am issuing them for "interim" implementation in advance of an order. I know I can count on your cooperation in using the guidelines to advance U.S. national security and nonproliferation policy.

Troy E. Wade II
Acting Assistant Secretary
for Defense Programs

Attachment

1/18/89

# GUIDELINES ON EXPORT CONTROLLED INFORMATION

## Purpose

The Office of Classification and Technology Policy (OCTP) has prepared these guidelines to assist Department of Energy (DOE) Headquarters offices, field offices, and contractors in implementing a consistent and technologically sound policy regarding dissemination of unclassified information that could adversely affect U.S. national security or nuclear non-proliferation objectives. Such dissemination can occur through:

- Publications.
- Presentations at conferences or other forums.
- Foreign national visits or assignments to DOE facilities.
- Foreign travel by DOE or DOE contractor employees.
- Commercialization.
- Other means of communication such as telephone calls and mailings.

When unclassified information bearing on sensitive technology --- nuclear or nonnuclear -- is disseminated without restriction, among the beneficiaries may be nuclear proliferant or potentially adversary countries. Of special concern is the dissemination of unclassified information on technologies supporting nuclear weapons design and production. Unrestricted disclosure of such information to proliferants is inconsistent with U.S. commitments under the Treaty on the Non-Proliferation of Nuclear Weapons (NPT). The purpose of these guidelines is to help in protecting against the inadvertent transfer of sensitive unclassified information to nuclear proliferants or to other foreign interests potentially inimical to the United States.

## Policy

By international treaty, statutes, and policy, DOE is committed to encourage the dissemination of scientific and technical information consistent with U.S. national security and nuclear nonproliferation objectives. The NPT obligates its nuclear-weapon-state adherents not to help other countries acquire nuclear weapons technology and, at the same time, to facilitate the exchange of information for the peaceful uses of nuclear energy. DOE policy and procedures on the dissemination of scientific and technical information must reflect the overall DOE commitment to broad dissemination, the dual NPT obligations to both control and disseminate, and, at the same time, concern for U.S. national security interests. These sometimes conflicting needs may require that limits on the dissemination of information should be imposed, but only after careful consideration.

When it is necessary to control access to information, the primary means is and will remain the classification system. However, legal, operational, scientific or historical considerations may make it impractical, ill-advised or even impossible to classify some information significant to national security or nonproliferation objectives. Existing statutes and regulations placing controls on the export of some kinds of unclassified information are valuable tools for dealing with this problem. Areas of principal concern to DOE are those of Unclassified Controlled Nuclear Information (UCNI) as defined in section 148 of the Atomic Energy Act, and other information subject to export controls under the Atomic Energy Act, the Nuclear Non-Proliferation Act, the Export Administration Act, and the Arms Export Control Act. These statutes and their implementing regulations require Department of Commerce (DOC) or Department of State (DOS) licenses or the Secretary of Energy's authorization before certain unclassified nuclear and nuclear-related technical information can be exported.

Pursuant to its regulations 10 CFR Part 810, DOE reviews and either approves or denies private sector proposals to export scientific and technical information about certain kinds of nuclear technology. In contrast, no statutory control exists with regard to dissemination of a DOE-sponsored publication or release containing what would otherwise be "Export Controlled Information" (ECI). Export of such information could be denied if a private person sought the Department's approval; the lack of a review and approval process for DOE-sponsored works can defeat the intent of the NPT, laws or regulations. These guidelines are intended to help in determining the information requiring review and possible control and to encourage a reasoned weighing of national security and proliferation concerns against the value of scientific scholarship and technological advance when considering dissemination of information in sensitive areas.

## Scope

These guidelines are applicable to all unclassified DOE-produced scientific and technical information in the possession or control of DOE or its contractors which a private person could not export lawfully without a license under the Arms Export Control Act, the Export Administration Act, the Atomic Energy Act, or the Nuclear Non-Proliferation Act. The principal focus of the guidelines is on information about nuclear and nuclear--related design, engineering, development, construction, operation and other activities pertinent to technological advance. There is also a less-detailed section on information about other sensitive technologies.

The guidelines do not apply to fundamental research as defined in National Security Decision Directive (NSDD) 189*. Such research, conducted to advance general knowledge rather than particular applications, is not of export control concern. In extraordinary circumstances fundamental research may be classified if it seems particularly significant to national security. The guidelines do not affect procedures for dealing with potential generation of classified information by fundamental research.

The areas of concern embrace the full range of technologies pertinent to nuclear proliferation and national defense, described in detail in the congressionally mandated Militarily Critical Technologies List (MCTL). Nuclear-related technologies are of most immediate concern to DOE and its contractors and are treated here in greater detail than other sensitive technologies.

Nuclear-Related Information Categories

The following discussion of categories of nuclear-related technical information seeks to characterize the concerns each raises so that the possible need for controls in specific cases can be determined. Where it appears that ECI scientific or technical information may be involved, more specific guidance can be obtained from the DOE Nuclear Technology Reference Book (NTRB), which is available at appropriate offices. The NTRB was prepared by the Critical Technologies Group at Los Alamos National Laboratory with the assistance of Technical Working Group 11, which includes representatives from most DOE facilities that generate nuclear weapons information and from the DOE Office of Nuclear Energy. The NTRB was developed from Section 17 of the MCTL and contains complete listings of nuclear and nuclear-related technologies, with explanatory notes and descriptions. Note, however, that inclusion of a technology category in the NTRB or MCTL is not in itself a reason to limit dissemination of all information in the category; rather, it is a reason to review the specific information involved in order to determine whether limitation is warranted.

* NSDD 189 defines fundamental research as "basic and applied research in science and engineering, the results of which ordinarily are published and shared broadly within the scientific community, as distinguished from proprietary research and from industrial development, design, production, and product utilization, the results of which ordinarily are restricted for proprietary or national security reasons."

## Nuclear and Nuclear-Related Materials Technology

This category comprises information on the preparation or enrichment of nuclear fuel, reprocessing of irradiated fuel, fabrication of nuclear fuel containing plutonium, and production of heavy water or other materials of particular importance for nuclear weapons. These technologies all contribute to acquisition or enhancement of nuclear weapons capability and thus are of both proliferation and national security concern, and the more sensitive aspects are classified. Nevertheless, unclassified information on the preparation and handling of materials, separating elements, process control, process design, and theory of operation for enrichment processes may be ECI and therefore subject to these guidelines.

Areas of concern dealing with enrichment technologies for the production of fissile materials include (with references to the NTRB):

- Uranium Hexafluoride Production Technology .....(Section 3.1)
- Gaseous Diffusion Technology.....(Section 1.1)
- Gas Centrifuge Separation Technology.....(Section 1.2)
- Aerodynamic Separation Technology.....(Section 1.3)
- Chemical Exchange Separation Technology.....(Section 1.4)
- Electromagnetic Separation Technology.....(Section 1.5)
- Laser Isotope Separation Technology.....(Section 1.6)
- Plasma Separation Technology.....(Section 1.7)

Information on the production of other important nuclear-related materials also may be ECI:

- Heavy Water Production Technology.....(Section 3.2)
- Lithium Isotope Separation Technology.....(Section 3.3)

Information on the chemical and physical processing of spent fuel elements, design of automated equipment for remote handling in quantity, and development of process components capable of enduring high-radiation environments may be ECI if it pertains to:

- Tritium Production and Processing Technology.....(Section 2.1)
- Nuclear Reprocessing Technology.....(Section 2.2)

## Nuclear Reactor Technology

Technologies for design, development, construction, and operation of nuclear fission reactor systems are subject to export control owing to both proliferation and direct military concerns. Information on fuel element technology, and related techniques for non-destructive testing, control system technology, cooling and containment systems may be ECI and therefore subject to these guidelines. For general purpose reactors, areas of concern include:

- o Reactor Systems Technology.....(Section 4.1)
- o Naval Nuclear Propulsion Technology.....(Section 4.2)

Reactors intended as mobile power sources may require development of high temperature fuels, high technology energy conversion systems, and heat rejection systems, all of which may involve ECI. Specific areas of concern:

- o Space Reactor Systems.....(Section 4.3)
- o Mobile and Portable Military Reactor Systems...(Section 4.4)

## Nuclear Weapons Technology

It is useful to separate technology applicable to research, development, testing, and production of nuclear weapons from that relating to deployment of nuclear weapons.

Complex and sophisticated computer codes play an essential role in the design and development of nuclear weapons. Codes revealing classified information, or nuclear weapons codes identified as weapon codes, are classified as SRD or CRD; publication or other access to these codes or their techniques and algorithms is restricted and export is possible only under government-to-government agreement. In addition, computer codes developed for other applications, but which may be associated with nuclear weapons design could be ECI unless the techniques and algorithms used are broadly applicable and already generally available. In particular, codes developed in DOE laboratories for application to inertial confinement fusion, reactor safety, or modeling astrophysical phenomena should be carefully reviewed before being made generally available.

Information on experimental techniques for nuclear weapons test and diagnosis must be considered carefully. If the equipment or technology described is essentially useful only for weapon R&D, then access to reports, facilities, etc., should be limited to the U.S. Government and its U.S. contractors and dissemination to foreign nationals should be barred. On the other hand, if the technology is only incidentally useful for weapons R&D and can also serve other, more benign purposes, a review may determine the desirability of release to U.S. industry and to friendly

countries with strong nonproliferation credentials. The NTRB provides detailed information in Section 5.1 (Nuclear Explosive Research and Development Technology).

Weapons production technology -- particularly information describing production problems, solutions, and technology -- should be controlled on the basis of the test described in the previous paragraph. In other words, if the technology is essentially of use only to weapons production, i.e., unique in application, and yet not classified, access to related information should be limited. Otherwise, for general purpose or widely applicable technology, restrictions on dissemination are not appropriate unless the mere fact of association with the originating agency carries sensitive implications. General areas of concern, with NTRB sections:

- o Nuclear Explosive Production Technology.....(Section 5.2)
- o Special Nuclear Explosive Component Technology.....(Section 5.3)
- o Special Materials Technology.....(Section 5.4)

Certain technologies central to the deployment and management of nuclear weapons by the military forces may also be subject to export controls. Information on the delivery performance characteristics of nuclear weapon systems (e.g., external envelopes, flight characteristics, parachutes) is generally nonnuclear and any controls on such information should derive from DOD guidance. On the other hand, gratuitous dissemination of unclassified information describing PAL (Permissive Action Links) and disablement systems in other than general terms should be discouraged (NTRB Section 5.5).

## Inertial Fusion Technology

Inertial confinement fusion (ICF) shares with nuclear weapons a common technological base in materials processing and fabrication, implosion design, and diagnostic techniques. Accordingly, the guidelines developed for these areas are appropriate for use in deciding whether information developed in ICF R&D should be subject to dissemination constraints. The NTRB (Section 7.1) provides detailed guidance on "safe" and "sensitive" areas in ICF.

Other Sensitive Technologies

Other technologies often related to acquisition of a nuclear weapons capability should also be reviewed as sensitive, including technologies that are advancing so rapidly that a reasonable projection of their military applications may cause aspects of them to become classified or subject to export control. Because they are nonnuclear, these technologies are discussed in the MCTL and not in the NTRB. Again, note that inclusion of a technology in the MCTL is not in itself sufficient reason to limit dissemination of all information in the category; rather, it is reason to review the specific information involved to determine whether limitation is warranted. Technologies in this group (with references to the MCTL) include:

- Computer systems, components and software .....Chapters 1-3 specifically designed for military application.
- Advanced concepts of computer-aided.....Chapter 4 design, manufacturing or testing.
- Computer security procedures involving encryption...Chapters 2-3
- Secure computer-controlled communications systems...Chapters 9-10
- Manufacturing and fabrication .....Chapter 5 of high performance materials.
- Directed energy systems technologies: .....Chapter 6
  - Extremely high energy, high brightness lasers.
  - Extremely high current, high brightness particle beams.
  - High kinetic energy macro particle accelerators.
  - Very high power radio frequency power sources involving very short or very long wavelengths.
  - High energy electrical power conditioning systems for these technologies.
- Techniques for preparing ultra-high purity .....Chapter 7 semiconductor materials.
- Very high speed instrumentation and diagnostics ....Chapters 8 that may be applicable to directed energy and 20 systems and weapons development.
- High energy density batteries and fuel cells .....Chapter 19
- Fabrication techniques for very high field.....Chapter 19 large bore superconducting magnets.

Determination Criteria

The fact that certain technical information falls in one of the sensitive categories or is discussed in the NTRB or MCTL is not sufficient to determine that dissemination or other access to the information should be controlled. Instead, the reviewer should establish whether the information, if proposed for export by a private firm or individual, would require an export license or authorization. If so, the reviewer should evaluate the significance of the information by subjecting it to at least two tests:

- Could uncontrolled release of the information reasonably be expected to adversely affect U.S. national security?
- Could uncontrolled release of the information reasonably be expected to contribute to nuclear proliferation?

The two tests can be made more specific by asking, if the information under review were freely available,

- Could an adversary country:
  - gain significant technical advantage?
  - negate a U.S. advantage?
  - find it significantly easier to develop weapons or make other military applications?
- Could a would-be proliferant:
  - significantly improve its ability to develop nuclear weapons?
  - gain significant know-how for producing or preparing nuclear weapon materials?
- Is the information of such character that association with the originating agency would implicitly enhance its value to an adversary or proliferant?

If the reviewer concludes that unlimited dissemination would adversely affect U.S. national security or nonproliferation objectives, the information should be designated ECI, and its uncontrolled dissemination, especially uncontrolled foreign dissemination, should be avoided. The stress on "uncontrolled" serves to emphasize that these guidelines are not to be construed as limiting information exchange among DOE or DOE

contractor employees, exchanges based upon agreements for international collaboration, exchanges under U.S.-approved programs of the International Atomic Energy Agency, or exchanges with countries posing no national security or proliferation concern.

A careful application of the tests will generally distinguish information uniquely applicable to sensitive technology (e.g., preparation and handling of UF6) from information of little concern because of its broader utility and availability (e.g., hexafluorides in general).

Review Mechanisms

DOE and contractor employees and their supervisors are responsible for the proper designation and control of information being released by publication or other means. As a rule, information judged to fall into one of the information categories cited in these guidelines should be carefully reviewed. If information is determined to be ECI, it should be released domestically only to a controlled distribution (such as Nuclear Energy's Applied Technology lists) and should not be released to foreign countries, organizations or individuals unless authorized by the appropriate Headquarters program manager or by a reviewer to whom the program manager has delegated the authority. A program manager or a reviewer with delegated authority may direct release of ECI to foreign recipients under a technical cooperation agreement that has been reviewed and approved by OCTP's Technology Policy Division. However, again as a rule, foreign nationals visiting or assigned to DOE facilities should not have access to ECI. Nor should DOE and contractor employees traveling abroad discuss ECI.

Reviews of technical information can best be accomplished by using existing review mechanisms -- such as classification offices -- in contractor organizations, field offices and DOE Headquarters program offices. Classification offices will have copies of the NTRB, the MCTL, and the pertinent export control regulations: DOE's regulations 10 CFR Part 810, "Assistance to Foreign Atomic Energy Activities"; the Department of Commerce's Export Administration Regulations, especially 15 CFR Part 378, "Special Nuclear Controls," and 15 CFR Part 379, "Technical Data"; and Department of State regulations 22 CFR Parts 121-130, "International Traffic in Arms Regulations."

Headquarters program offices may provide their own review mechanisms by certifying as part of the procurement request, program letter or other authorizing document that the activity to be carried out has been reviewed and is not of a nature likely to generate ECI.

The ECI review process should be initiated early enough to avoid conflicts with planned publication, presentation, distribution, or visit schedules, and should be consistent with DOE Orders 1430.1A and 1430.2A requiring that contractors or field or program offices forward reports to the Office of Scientific and Technical Information (OSTI), Oak Ridge, Tennessee, with a completed DOE Form 1322.15, DOE and Major Contractor Recommendations for Announcement and Distribution of Documents. The form sent to OSTI may be used to record the outcome of the ECI review, including dissemination guidance. When no dissemination guidance is given, OSTI will provide the report on request only to DOE and its major U.S. contractors.

Persons reviewing their own material should inform their supervisors of their findings. Supervisors should ascertain that reviewers are technically qualified and have an understanding of the factors involved in technology transfer. Supervisors also should document that ECI issues have been considered as part of the clearance process for a publication, meeting presentation, response to a foreign request for technical information, or plan for controlling access by a foreign national.

A reviewer who determines that information constitutes ECI should indicate the permissible dissemination. For example, a reviewer might authorize dissemination only to DOE and its Managing and Operating (M&O) contractors ("GOCOS"), or only to Federal agencies and their U.S. contractors, or only to U.S. requesters known to be bona fide. The reviewer might attach to the document a list of authorized recipients or a "non-dissemination" list of sensitive countries. In any case, ECI dissemination guidance is intended to prevent release of information to unauthorized foreign governments, firms and individuals without first being referred to and reviewed by the Headquarters program office. A Headquarters program office authorizing release to an otherwise unauthorized recipient should notify the reviewing office and OSTI of the action. ECI documentation should be maintained at reviewing offices and be available to Headquarters program managers and OCTP. This documentation should include any foreign requests for material determined to be ECI, the disposition of the request and the reason therefor. Headquarters program managers should monitor review activities periodically to assure consistency and uniformity.

A review finding that a proposed release of information is likely to result in technology transfer inconsistent with the intent of export control regulations may necessitate revision of the content or distribution. In the case of an oral presentation, restriction of foreign participation in a meeting may be advisable. Abstracts or proceedings associated with such oral presentations also should be reviewed. In the case of a visit or the assignment of a foreign national to a DOE facility, measures should be taken to prevent access to ECI. A DOE or contractor employee going abroad may need to consider ECI aspects of planned discussions. In the case of transfer of DOE technology to a U.S. private firm for commercialization purposes, contracts should restrict retransfer of the technology to foreign firms.

As experience is gained, program managers and laboratories and other contractor facilities may determine they need more detailed "program guidelines" or "facility guidelines" for their specialized areas of activity. Such guidelines may be prepared by local program managers and other experts familiar with the technologies involved. However, to insure consistency among locally prepared and applied guidelines, these should be reviewed by the appropriate Headquarters program office in coordination with the Director of OCTP (DP-32).

A useful approach in introducing ECI review procedures may be to have authors conduct a review jointly with a technology specialist and then to inform both the author's supervisor and the classification office of the ECI determination. Such joint ECI reviews should establish a basis (through lessons learned) for detailed guidelines in particular technologies. As detailed guidelines become available, the classification office should be better equipped to combine ECI review into the classification review process.

When no review mechanisms exist, it is the responsibility of Headquarters program managers to arrange their establishment in contractor organizations, field offices and Headquarters program offices, as necessary. If differences emerge regarding facility guidelines or their application, or if review bodies in contractor organizations or field offices are unable to make a clear determination regarding a planned publication, presentation or distribution, they should refer the matter to the Headquarters program office; if necessary, the Headquarters program office may seek the advice of OCTP's Technology Policy Division (Telephones: Commercial (202) 586-2112; FTS 896-2112).